LAGUNA SCIENCE INTEGRATED HIGH SCHOOL

SENIOR HIGH SCHOOL DEPARTMENT

LEARNER'S ACTIVITY SHEET IN CAPSTONE RESEARCH

Topic:	Basic and Applied Research	Week No:	
Quarter:	3rd Quarter	Lesson No:	

NAME: Buendicho, John Lamuel T. DATE ACCOMPLISHED: _____

GRADE AND SECTION: XII-Darwin Group No.:_____

Directions: Identify and explain why given Abstract is an applied or basic research

1. Meeting the Challenges of STEM Education in K-12 Education through Design Thinking

This paper explores the ways in which the design thinking (DT) approach can be utilized in addressing the challenges of STEM education in K-12 education. The study is based on an extensive literature review about STEM education and the DT approach, and exploratory research conducted to understand the challenges and needs of STEM education in Turkey. The findings from the exploratory research indicate that STEM education in Turkey has significant challenges: The teachers have difficulties in integrating diverse disciplines and technologies into their STEM activities; the training programs for teachers and the general education for students encourage a result-oriented mindset rather than a process-oriented approach; and the teachers have difficulties in following the problem-solving process based on the engineering design approach. Furthermore, collaboration among teachers for developing and implementing STEM activities needs to be addressed as an important issue in terms of scheduling. Additionally, there is a need to develop STEM activities appropriate to the educational level of students. Equipping teachers with skills and knowledge appropriate to their new roles as guides and mentors should also be considered as a significant issue concerning the implementation of STEM activities. The study concludes that the DT approach as an interdisciplinary, collaborative, and human-centered problem-solving process can support STEM education and resolve the stated challenges. This study also suggests that there is a need to develop a customized DT approach for teachers, non-designers, so that they can easily apply their expertise to STEM education.

Answer: This research is an Applied Research because it is a research that aims to solve specific practical problems or answer certain questions. The research above aims to explores the ways in which the design thinking (DT) approach can be utilized in addressing the challenges of STEM education in K-12 education.

2. Educing AI-Thinking in Science, Technology,Engineering, Arts, and Mathematics(STEAM) Education

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In science, technology, engineering, arts, and mathematics (STEAM) education, arti?cialintelligence (AI) analytics are useful as educational sca?olds to educe (draw out) the students'AI-Thinking skills in the form of AI-assisted human-centric reasoning for the development of knowledge and competencies. This paper demonstrates how STEAM learners, rather than computer scientists, can use AI to predictively simulate how concrete mixture inputs might a?ect the outputof compressive strength under di?erent conditions (e.g., lack of water and /or cement, or different concrete compressive strengths required for art creations). To help STEAM learners envision how AI can assist them in human-centric reasoning, two AI-based approaches will be illustrated: ?rst, a Naïve Bayes approach for supervised machine-learning of the dataset, which assumes no direct relations between the mixture components; and second, a semi-supervised Bayesian approach to machine-learn the same data set for possible relations between the mixture components. These AI-based approaches enable controlled experiments to be conducted in-silico, where selected parameters could be held constant, while others could be changed to simulate hypothetical "what-if" scenarios. In applying AI to think discursively, AI-Thinking can be educed from the STEAM learners, thereby improving their AI literacy, which in turn enables them to ask better questions to solve problems.

Answer: This research is a Basic Research because it is a research that aims to expand the existing base of scientific knowledge with regards to AI-Thinking in Science.